

**Team:** 30 Team R.E.D.

**Presentation Time:** 9:30 AM

**Room:** 236

**Project Title:** “Live from Nutter Center – It’s Saturday Night, featuring Team RED!”

**Description:** Do you know what’s lurking in your burger? Oscar Rogers does. Luckily, Team RED knows how to FIX IT! Undercooking hamburgers can allow E. coli and other pathogens to survive and cause illnesses, but only 3% of people correctly check with a thermometer that their burgers are fully cooked. Our solution, the iPan, is an innovation that measures pan temperature and burger geometry to calculate the time it will take for the inside to reach the USDA recommended 160 degrees Fahrenheit. Join Team RED and see how to FIX IT!

**Team:** 38 2B Detonated

**Presentation Time:** 12:20 PM

**Room:** Berry 3

**Project Title:** “Which Came First, the Chicken or the Egg?”

**Description:** It turns out that Salmonella doesn't care; it infects both. However, there are several things you can do to keep this bacteria population from exploding in your eggs. We learned that salmonella detonates at 134 degrees, so we made our popper pan which tells you when all salmonella has been eradicated from your eggs. We learned that it's important to keep eggs at a cool, steady temperature of 40 degrees or below, so we also designed an egg cooler that makes sure that salmonella is stopped cold in its tracks while your eggs are in your refrigerator.

➤ **Global Innovation Award Applicant**

**Team:** 42 The Incredibots

**Presentation Time:** 9:30 AM

**Room:** 241

**Project Title:** “The Incredi-Veyor!”

**Description:** Our food is the watermelon and our problem is that watermelons can be contaminated by dangerous bacteria on grocery store conveyor belts. Checkout belts are teeming with potentially harmful bacteria and 80% of adults do not wash their watermelons with soap, so bacteria on the rind can get inside when cut with a knife. Our solution: The Incredi-veyor! The Incredi-Veyor is a checkout belt made of hydrophobic, Teflon-coated glass fabric that is continuously sanitized underneath using: 1) a water jet to remove residue, 2) an air knife to dry the belt, and 3) UV-C light to kill bacteria and viruses.

**Team:** 45 The Brickheads

**Presentation Time:** 11:30 AM

**Room:** Berry 3

**Project Title:** “Baby Formula Contamination in Third World Impoverished Nations”

**Description:** Contaminated baby formula in third world countries. Baby formula is sent to impoverished countries. Mothers in these countries can’t breastfeed due to diseases like HIV. Without formula, babies could get their mom’s disease or die of starvation. The problem occurs because lack of clean water to mix with the formula. Solution: Boil water killing the Cholera in the Boilificator 2000. The Boilificator uses a Battery, solar panels, and a heating element. The Boilificator is portable and can boil water in seven 7.5 minutes. We have presented the Boilificator 2000 to a local church and they are implementing it in Peru.

➤ **Global Innovation Award Applicant**

**Team:** 126 Exon Mobile

**Presentation Time:** 1:00 PM

**Room:** Berry 3

**Project Title:**

**Description:**

advances. After two hours, the ink flows into a chamber that covers the barcode, preventing it from being able to be scanned, the prefix "UN" appears next to the word "SAFE", making it "UNSAFE".

➤ **Global Innovation Award Applicant**

**Team:** 1061 Mechanical Faces

**Presentation Time:** 9:00 AM

**Room:** 241

**Project Title:** "Adapting Current Technology for Food Traceability"

**Description:** Did you know that the 2009 Peanut Butter Recall cost One Billion Dollars and was the most costly recall ever? We tackled food traceability issues and came up with a solution to help a consumer quickly identify if a product they purchased may have come from a source identified as the point of contamination. Through the use of Quick Response Code technology, our solution tags identification information through each step of a food's journey. All a consumer has to do is scan the QR code on the product label with a smart phone to see the entire ingredient supply chain.

**Team:** 1117 Metal Chihuahuas

**Presentation Time:** 10:30 AM

**Room:** 241

**Project Title:** "Where's the Beef? Where's the Burgerometer?"

**Description:** Escherichia coli 0157 H:7 is a deadly bacterium that multiplies rapidly in ground beef. It can sicken and even kill people. Found in the intestines of cattle, it is spread by fecal to oral transmission. The first human infection in 1982 was traced to hamburger. When ground beef is cooked to 160 degrees Fahrenheit, the E. coli is killed. **BURGEROMETERS**, which are *disposable thermometers with thermochromic ink sold in packets on ground beef*, would let people know when their hamburgers were cooked enough to kill E. coli bacteria, and would be a convenient way to keep people safe from E. coli.

**Team:** 1063 Moderately Confused

**Presentation Time:** 10:00 AM

**Room:** 236

**Project Title:** "Erasable Barcode"

**Description:** Have you ever wondered about the safety of your food at the grocery store? Or at home? Our solution, the Erasable Barcode, prevents the sale of meat stored at improper temperatures, and lets the consumer know if exposure occurs after the food has left the grocery store. On activation the Erasable Barcode shows the word "SAFE" appears. As the time outside the temperature increases, the ink

**Team:** 1197 LCCS Thunderbots

**Presentation Time:** 12:20 PM

**Room:** 240

**Project Title:** "E-Beam Microwave"

**Description:** Lettuce can be contaminated with bacteria at almost any point from the time it is in the field to the time it enters our mouths. We can even contaminate it in our own kitchen if not handled properly. The team believes that modifying a microwave to include electron beam irradiation technology is an answer to eliminating the bacteria. The electron beam destroys the DNA and other essential molecules

in the bacteria, killing the bacteria and making the lettuce safe to eat.

**Team:** 1638 DREP (Dominion Robotics & Engineering Program)

**Presentation Time:** 11:30 AM

**Room:** 240

**Project Title:** "Lettuce Safety Seal the Danger Zone"

**Description:** Lettuce frequently harbors pathogens. Even when lettuce is washed, these bacteria can be present. When lettuce with these harmful bacteria are stored in the danger zone (40° to 140°), bacteria can double in twenty minutes. Without visible signs of the contamination this presents a danger to the consumer. Our solution is to label lettuce with a "safety seal," indicating if the package has been stored in the danger zone for too long. Using thermochromatic ink, costing only a fraction of a cent, the label changes color when the product has been stored improperly alerting consumers to possible contamination.

**Team:** 2146 Bumble Bricks

**Presentation Time:** 11:00 AM

**Room:** Berry 3

**Project Title:** "Safe Salad"

**Description:** If prepackaged salads are not washed properly and kept at a low temperature, traces of bacteria such as e-coli and salmonella can reproduce to harmful levels leading to serious illness and sometimes death. Salads are not cooked so bacteria will not be killed. Our solution uses a temperature indicator attached to prepackaged salads for monitoring the salad's temperature from processing plant to consumer. Once activated at the processing plant, the indicator will permanently record any time spent above 41 degrees Fahrenheit for up to 12 hours. Any

salad above temperature for more than two hours is considered unsafe for consumption.

**Team:** 2434 Loveland LEGO Legends

**Presentation Time:** 11:30 AM

**Room:** 236

**Project Title:** "Hamburger..E Coli...What's the Big Deal?"

**Description:** Cattle carry E. Coli 0157:H7 in their gut. The bacteria do not cause illness in cows but does cause approximately 25,000 humans in the United States to become ill each year. The symptoms can range from mild to life threatening. Typically, contamination is identified at the processing facility but not always. If that beef passes into the supply chain and is not properly prepared, illness or death can occur. What is a consumer to do? Our innovative solution the EIdentify enables the consumer to test cooked ground beef products for the presence of E. Coli 0157:H7. If the bacteria are present, the food can be cooked further or thrown away.

**Team:** 2449 Mops

**Presentation Time:** 10:30 AM

**Room:** Berry 3

**Project Title:** "Gators Take a Bite out of Black Sigatoka!"

**Description:** Mops' project is stopping Black Sigatoka a fungus that attacks banana plants because of high humidity on the plant's leaves. Our solution is to equip a John Deere Gator with 3 large barn fans to drive through the banana rows to create an air flow to lower the humidity levels near the leaves. We conducted an experiment. It proves the fans do lower the humidity levels, but at a slow pace. We spoke with many individuals/groups regarding our project, most notably Greg (John Deere), Larry Phillips (farmer), and Dr. Scott Nelson (University of Hawaii).

**Team:** 2613 HB Blazerbots

**Presentation Time:** 12:00 PM

**Room:** 240

**Project Title:** "World Hunger is the Largest Problem Facing the Human Race"

**Description:** World hunger is the largest problem facing the human race. Each year, twenty five percent of the worldwide food supply is lost to spoliation from insects and bacteria. The Blaze-Irradiator can help reduce this loss by destroying the insects and bacteria on goods while maintaining the good's integrity and nutritional value. Designed for spices, the Blaze Irradiator releases Cobalt 60, a radioactive material in solid form, in an underwater controlled environment. The Cobalt's gamma rays pass through the watertight containers (holding the spices) disrupting the DNA of any insects/microorganisms on the spices. The spices are radiation and bacteria free when they exit the pool.

**Team:** 2926 Sonic Boom

**Presentation Time:** 10:30 AM

**Room:** 240

**Project Title:** "Food News Nightly: E-coli vs. Coriander"

**Description:** Sit back and relax! Watch the 11:00 news tonight. Newscasters Vendel and Gleeson are interviewing the FLL team, Sonic Boom, who have come up with a solution to eliminate the problem of the deadly E-coli. Watch as Sonic Boom presents their amazing solution with the Coriander Mister. This invention will revolutionize the way you eat ground beef. The Coriander Mister mists ground beef with coriander oil. Will this be enough to conquer E-coli? Stay tuned to find out.

**Team:** 3508 Digital Divas

**Presentation Time:** 12:20 PM

**Room:** 241

**Project Title:** "The DDC"

**Description:** If you like going on picnics then the Digital Divas Ceater is right for you. The heating side has coils that keep food at a safe 140 degrees and the cooling side has a compressor that pumps freon and keeps cool foods at a safe 40 degrees. We invented the ceater to help prevent many food related illnesses and deaths in America.

**Team:** 4057 Monster Maniax

**Presentation Time:** 9:00 AM

**Room:** 236

**Project Title:** "O-Box 3000"

**Description:** Food contamination with microbes in school lunch boxes is a major health concern. Our research has shown ozone to be a highly effective microbe killer. It is a lunchbox capable of generating ozone to kill the bacteria on food or in the container. It takes approximately 72 seconds to generate and distribute the ozone. The generator consists of a micro-fan, 12V rechargeable battery, transformer and corona generating electrodes. Oxygen molecules in air are split into atoms by a corona discharge and recombine to form ozone, which is distributed in the food storage compartment. This feasible and inexpensive solution kills bacteria, and only costs about \$37. Overall, this solution can help to prevent the bacterial contamination of food in kids' lunchboxes.

**Team:** 4422 LCCS Lightningbots

**Presentation Time:** 10:00 AM

**Room:** Berry 3

**Project Title:** "Chocolate's Fresh Companion"

**Description:** Chocolate has unique potential contaminates during harvest and manufacture, however, once provided to the consumer comes the largest contaminate of all... the fact that we lick our fingers. Studies show a major cause of food borne illness is fecal pathogens on the fingertips! Traditional hand wipes and antibacterial sanitizers are made with non-ingestible ingredients. The team made and successfully tested natural hand wipes made with vinegar (a known effective cleaner) and baking extracts. Advertised for sale individually or packaged with a box of chocolates, wouldn't you gladly clean your hands before enjoying your treat with a convenient, say, peppermint wipe?

**Team:** 4439 Brick Warriors

**Presentation Time:** 11:00 AM

**Room:** 236

**Project Title:** “Catch Up with Fred the Tomato”

**Description:** Travel to the Hydroponic Perfection Plant, where Farmer Young McDonald and his crew will show you how tomatoes should be grown, packaged, and distributed for maximum safety and freshness. And discover the fate of Fred. Will he be rejected in favor of a tomato that may be contaminated with salmonella, or will he make it safely to the shopper's table? Come see our presentation and find out!

**Team:** 4547 Pirates of the Lego Storm

**Presentation Time:** 1:00 PM

**Room:** 236

**Project Title:** “The Happy Face Indicator”

**Description:** We have developed a device that will detect whether a shipment of food has ever been over the correct temperature. It works much like a glowstick. There are two rigid

capsules filled with two different colors of water inside a bigger, flexible tube. The device can be stored at room temperature until it is ready to be shipped. When it is frozen, it can be bent and the smaller capsules will break, but the ice will still be frozen. The device is then placed in a shipping container with the food. If the container's temperature becomes too high, the water will melt and the colors will mix, changing shade. If it later refreezes, it will still be a different color.

**Team:** 4615 Lordstown Bot Kickers

**Presentation Time:** 9:30 AM

**Room:** Berry 3

**Project Title:** “Lettuce Destroy Listeria”

**Description:** The problem our team chose to resolve is Listeria contamination in lettuce. Listeria is bacteria capable of causing illness or death in the elderly, newborns, and pregnant women. After many weeks of research, we had a breakthrough. Our solution is called Clean as Silver. We put silver powder into a natural fertilizer to make an unstoppable Listeria-killing formula. The powder is not water soluble, so it will not wash away and is environmentally friendly. Clean as Silver is not hazardous. Once you plant your seed, all you have to do is put a little Clean as Silver on it. This will prevent Listeria from ever growing on your lettuce.

**Team:** 5016 Blazing Brains

**Presentation Time:** 1:00 PM

**Room:** 241

**Project Title:** “pHlimBot: Reducing the Uptake of Heavy Metals from your Garden”

**Description:** We spent time at Kent State University learning about Atomic Absorption and Inductively Coupled Plasma and at the Soil Lab of Ohio State University, understanding soil

testing and that low pH corresponds to a higher rate of metal uptake in food during growth. We learned that due to the industrialization in the area, there is heavy metal contamination in the soil. And we tested soil and rain samples in the community and, finding them all to be acidic, created and posted a flowsheet on bulletin boards to inform families to test their soil and minimize their risk of heavy metal contamination. We also designed an autonomous robot able to test soil for pH, soil type, and then distribute the correct fertilizer amount in gardens to decrease risk of heavy metal contamination in food.

**Team:** 5017 BreadOMatic 5000

**Presentation Time:** 11:00 AM

**Room:** 241

**Project Title:** "The Journey of Milk"

**Description:** Our team's research project is about milk and how it affects us when it goes bad. We researched the whole process of making milk from the dairy farm to the consumers. We paid a visit to a dairy farm and interviewed the farm owner. We interviewed a milk truck driver, a Dairyman's milk factory worker and a Giant Eagle grocery store manager. Milk gives out acid when bacteria form. After all these interviews and field trips we decided that milk's spoilage problem could be solved by measuring acidity and temperature of milk. So we made a pH strip thermometer. We believe this product is useful at home.

**Team:** 5044 Queen Bees

**Presentation Time:** 11:30 AM

**Room:** 241

**Project Title:**

**Description:**

**Team:** 5971 RoboMinds

**Presentation Time:** 10:30 AM

**Room:** 236

**Project Title:** "RefriDesk"

**Description:** The problem that RoboMinds has decided to solve is that when food is left out or on a table, bacteria can grow on it and make it uneatable and a waste. The solution RoboMinds came up with was the refriDesk. The RefriDesk is a desk-refrigerator hybrid. It has a main desk that is a normal desk but you can open it from the top to access an eating area that if you leave food in it it keeps it fresh. It also has other compartments that are represented later.

**Team:** 6610 Team Dynamite

**Presentation Time:** 9:00 AM

**Room:** 240

**Project Title:** "That Awful Bacteria"

**Description:** Food contamination from money? Food vendors, restaurants and groceries beware! Money is a carrier of 97 viruses and bacteria. We have a solution to eliminate the bacteria on money for you - The Cash Cleaner1! This invention will clean and sort the money and it can work with your register. Your customer places the money in a slot; it travels on a clear conveyor belt. UVC light turns on and hits the money as it bounces off of reflective walls. UVC is germicidal scrambling the bacteria's DNA causing it die. The money travels a slide and is sorted into the money drawer.

**Team:** 6962 TNT

**Presentation Time:** 12:00 PM

**Room:** 236

**Project Title:** "TnT: Time n Temperature"



**Description:** The TnT device will monitor the temp of the refrigerator and how long it has been at an unsafe temperature. Following the guidelines of the USDA, if your food goes over 40 degrees for 2 hours or over 90 degrees for 1 hour the device will alarm to tell you that your food is spoiled. We programmed an NXT as a real working prototype.

**Team:** 6966 Waco Robotics

**Presentation Time:** 12:00 PM

**Room:** 241

**Project Title:** “Cow Wash”

**Description:** An innovative system for mid size dairy farms to wash their cows prior to milking to reduce the likelihood of milk contamination and disease. Presentation includes a skit about a challenged family farm and a supportive salesman and his loyal assistant.

**Team:** 7137 Bananas

**Presentation Time:** 10:00 AM

**Room:** 241

**Project Title:** “Bacterial Contamination of Cantaloupes”

**Description:** As a cantaloupe travels from the field to the store, many different things can contaminate it: workers with unwashed hands, standing water on equipment that grows bacteria, animal waste in the field, and people with unwashed hands examining the cantaloupe in the store. Our experiment showed that washing cantaloupe eradicates a large amount of bacteria; it is the FDA’s suggestion. However, there is a problem with this solution - the brush used to wash the cantaloupe can become contaminated. We designed a brush sterilizer that uses ultraviolet rays to solve this problem.

**Team:** 7692 Bacteria Busters

**Presentation Time:** 9:30 AM

**Room:** 240

**Project Title:** “Improving the Dish Washing Process in Tanzania, Africa”

**Description:** Our team worked with the Angel House orphanage in Tanzania, Africa to improve their dishwashing process. They currently lack clean water and electricity to heat the water. The bacterium clings to food particles that remain on the dishes resulting in contamination and, ultimately, infectious diseases. Our goal was to find cheap, low power solutions to solve this problem. We utilized a bio-sand filter for water purification. To solve the heating problem, we used cheap black irrigation hose and solar radiation. Together, these systems can provide clean, hot water for a few hundred dollars.

**Team:** 8391 The *NUTS!*

**Presentation Time:** 1:00 PM

**Room:** 240

**Project Title:** “HAWCS – Hand Washing Checking System”

**Description:** The Hand Washing Checking System (**HAWCS**) is a multi-faceted approach to ensure that employees at fast food hamburger facilities properly clean their hands to prevent the spread of Hepatitis A and the Norovirus. Radio frequency identification (RFID) logs when an employee enters a restroom, monitors how much soap is dispensed and how long the hands are in the water stream. Custom designed software can immediately notify management as to any employee who did not properly wash their hands. Low ph (4.5 to 5.5) liquid soap and a quick drying moisturizer are used to decrease skin irritation and improve compliance.

**Team:** 8408 Blockheads

**Presentation Time:** 12:00 PM

**Room:** Berry 3

**Project Title:** "Listeria"

**Description:** A recent Listeria on Cantaloupe outbreak killed dozens. Listeria survived bleach solution washes in chlorine resistant bio-films on handling equipment. We found that Chlorine Dioxide is FDA approved for drinking water and food, kills bacteria, bio-films, viruses, etc. and has many advantages over chlorine. We developed Chlorine Dioxide bath (Lego model) for cantaloupes. Since Listeria is also found on lunch meat, hot dogs, and various fruits and vegetables and Chlorine bleach does not kill Listeria biofilms, we went on to develop a household Chlorine Dioxide product to easily and safely sanitize food and refrigerators at affordable cost.

➤ **In the process of applying for the Global Innovation Award**

**Team:** 8735 STEMbotics

**Presentation Time:** 9:00 AM

**Room:** Berry 3

**Project Title:** "The CURE"

**Description:** Our project is about contamination at salad bars. We researched and did experiments about bacteria found on customer's hands. Our Solution is to put a sink by the salad bar. A motion sensor on the sink starts the water when hands are present. Next to the sink is a hand dryer. While drying your hands, it scans your hands for bacteria you might have missed. Once it detects that your hands are clean, the plate popper pops up a salad plate. If your hands are still dirty, a plate is not dispensed and you are directed to wash again.

**Team:** 9545 Fellowship of the Brick

**Presentation Time:** 10:00 AM

**Room:** 240

**Project Title:** "Brick Butter, the Better Butter!"

**Description:** Our team studied the problem of Salmonella contamination in peanut butter. We learned that replacing common ingredients found in peanut butter (sugar, salt and hydrogenated vegetable oil) with bacteria-fighting ingredients (sea salt, honey and coconut oil) can inhibit the growth of salmonella in the jar. We researched the problem, toured the Jif plant, talked to experts, made our own peanut butter, conducted taste tests and bacteria-growth tests, and had a ton of fun!

**Team:** 10075 St. William Silver Dragons

**Presentation Time:** 12:20 PM

**Room:** 236

**Project Title:** "The Smart Refrigerator"

**Description:** The ten members of our team have been working on a smart refrigerator that's purpose is to improve food safety, especially expirations for milk. Alerting users of allergies, expirations, and recalls of food in the refrigerator. It accomplishes this by extracting data from QR codes on food products. The QR code will have all the information needed, it immediately checks if anyone is allergic to it, if it has expired, if the FDA has recalled it, or if the refrigerator's temperature goes over 45° F causing milk to spoil.

**Team:** 13660 Ge-NXT Engines

**Presentation Time:** 11:00 AM

**Room:** 240

**Project Title:** "Lettuce Eat (Let-us-eat)"

**Description:** Our team followed contamination in salads, specifically romaine lettuce which we



found can travel 6,386 miles from inception (seed) to consumption (supermarket). We found that most contamination can be addressed by washing hands and produce but a major problem in food safety is a lack of knowledge and lack of adequate facilities. To resolve these problems, we created a PSA to educate about hand-washing. We also performed experiments using water, FIT, or diluted hand-sanitizer to see which solution killed the most bacteria on lettuce. Our results led us to create a multi-purpose system for effectively washing hands and produce.